

**BASS DRUM PEDAL WITH ECCENTRICITY-ADJUSTABLE CAM SYSTEM**

**BY**

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**CLAIMING FOREIGN PRIORITY**

The applicant claims and requests a foreign priority, through the Paris Convention for the Protection of Industry Property, based on a patent application filed in the Republic of Korea (South Korea) with the filing date of  
10 October 01, 2002, with the patent application number 10-2002-0059724, by the applicant. (see the attached declaration)

**BACKGROUND OF THE INVENTION**

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**1. Field of the Invention**

This invention relates generally to improvements in a foot-operated bass drum pedal and more particularly to a bass drum pedal with a cam system wherein a user may adjust the eccentricity of the cam system to thereby obtain an  
20 optimized drum pedal for a user's performance.

**2. Description of Related Art**

A drummer plays the bass drum by pressing down the drum pedal. Each drummer needs his own drum pedal suitable  
25 to him because each drummer has different playing style and physical condition.

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BY *Sam Ai* PRINT Hana Choi

The primary factors that determine the overall feels of the drum pedal to the drummer himself and the performance characteristics are an impact force and a restoring force. In this description, the impact force is defined as a force acted on a bass drum head by a beater when the beater strikes the drum head, and the restoring force is defined as a force applied to a foot board by a spring to return the foot board to its original up-position.

A strong impact force enables the drummer to play a powerful performance, and a strong restoring force enables the drummer to play a speedy performance.

With the same stepping force on the foot board, the impact force acted on the drum head by the beater and the restoring force applied to the foot board by the spring depend on the torque arm of the cam system.

When the torque arm of the cam system is long, the impact force acted on the drum head by the beater is strong. But in this case, the restoring force applied to the foot board by the spring thereby returning the foot board to its original up-position is weak. On the contrary, when the torque arm is short, the impact force is weak and the restoring force is strong.

Because the impact force and the restoring force suitable to each drummer might vary, conventional drum pedal companies have provided many kinds of drum pedals, each of which has different torque arm of cam system,

thereby permitting the drummers to selectively purchase the  
suitable one to him. But when a drummer's playing style  
changes, a drummer must buy a new pedal. And if a drummer  
intends to try a variety of playing styles, he has to  
5 purchase a plurality of drum pedals with different cam  
features.

Therefore, there's been a need for a drum pedal  
wherein the torque arm of the cam system is adjustable. A  
prior art that meets the above need is U.S. Pat. No.  
10 6,172,291.

Said prior art provides a plurality of  
interchangeable cam members with different shape and radius  
for selective attachment to the drum pedal sprocket. But it  
takes a great deal of time to remove a cam member and  
15 interchange it with another one, and it is liable to lose  
the cam members not in use.

The present invention tends to solve the above  
problems and permits the user to tune the bass drum pedal  
up more efficiently and precisely to suit the user's style  
20 and ability without any risk of missing cam members.

#### **SUMMARY OF THE INVENTION**

Torque arm of the cam system is the distance from the  
axis of rotation defined by the rotating shaft to the outer  
25 surface of the cam system, and depends on the eccentricity  
of the cam system. Therefore if the eccentricity of the cam

system changes, so does the torque arm.

As a result, the impact force and the restoring force depend on the eccentricity of the cam system because the torque arm depends on the eccentricity of the cam system.

5       The present invention provides an enhanced bass drum pedal with an eccentricity-adjustable cam system wherein a user may easily adjust the eccentricity of the cam system thereby easily changing the impact force and the restoring force to suit his playing style and ability without  
10   interchanging cam members.

And with a single cam system of this invention the user can readily alter the performance characteristics, playing response and overall feels of the pedal to the user, so the user need not carry a plurality of cam members.

15       The present invention is embodied in a foot-operated bass drum pedal that includes a horizontally extending base plate, two upright posts mounted on and attached to the base plate, a rotating shaft rotatably supported by the two posts, a foot board hingedly connected to the base plate,  
20   an eccentricity-adjustable cam system mounted on the rotating shaft, a flexible drive linkage drivingly connecting the foot board with the cam system, a beater driven by the rotating shaft to strike a drum head, a crank carried by the rotating shaft, and a spring connected  
25   between the crank and the lower end of the post.

The flexible drive linkage, which partially overlies

the outer surface of the cam system, has two opposite end portions, one of which is anchored to the front portion of the foot board and the other of which is anchored to the eccentricity-adjustable cam system.

5       The eccentricity-adjustable cam system of this invention comprises a cam core mounted on and attached to the rotating shaft, a cam member rotatably connected to the cam core by a first pin, a positioning member rotatably connected to the cam member by a second pin, and a set  
10   screw fastening the positioning member onto the cam core.

      The positioning member is adjustably positioned onto the cam core by the set screw to thereby adjust the eccentricity of the cam system and accordingly torque arm. As a result, the impact force acted on a drum head and the  
15   restoring force applied to the footboard may be readily altered according to the user's intention. And a user may have a drum pedal suitable to his playing style and ability by adjusting the eccentricity-adjustable cam system.

      These and other objects and advantages of the  
20   invention, as well as the details of the illustrative embodiments will be more fully understood from the following specification and drawings.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

25       FIG.1 is a perspective view of bass drum pedal;  
      FIG.2A is a perspective view of eccentricity-

adjustable cam system of this invention;

FIG.2B is an exploded view of eccentricity-adjustable cam system of this invention;

FIG.3A is a side view of the eccentricity-adjustable cam system and beater of this invention as the beater  
5 strikes a drum head with the torque arm being maximum;

FIG.3B is a side view of the eccentricity-adjustable cam system and beater of this invention as the beater strikes a drum head with the torque arm being minimum;

FIG.4A is a perspective view of another embodiment of  
10 this invention;

FIG.4B is an exploded view of another embodiment of this invention;

15 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

As shown in FIG.1, basically a bass drum pedal of this invention includes an elongated horizontal base plate 1, two upright laterally spaced posts 2 mounted on and attached to the base plate, and a shaft 3 rotatably  
20 supported by the two posts via bearings located in the upper portions of the two posts.

The base plate supports all the other members of the drum pedal. Instead of the base plate, a suitable wire structure adapted to support the posts, foot board, and so  
25 on may be provided.

The shaft 3 extends between the two posts 2 and may

be polygonal to mount a cam system.

The eccentricity-adjustable cam system **100** is mounted on the shaft **3** and may have a corresponding polygonal bore **112** to closely fit the shaft **3**.

5       The shaft **3** carries a beater **4**, which is mounted on the shaft **3** in driven relation to strike a drum head.

      The eccentricity-adjustable cam system **100** engages a flexible drive linkage **7** driven by the foot board **6**. The flexible drive linkage **7**, which partially overlies the  
10   outer surface of the cam system **100**, has two opposite end portions, one of which is anchored to the front portion of the foot board **6** and the other of which is anchored to the eccentricity-adjustable cam system **100**.

      Although the drawings show a chain as the flexible  
15   drive linkage **7**, the flexible drive linkage **7** may be a chain or a strap.

      An elongated foot board **6** extends in inclined relation above the base plate **1**. The rear portion of the foot board **6** is hingedly connected to the base plate **1**, and  
20   the front portion of the foot board is attached to the flexible drive linkage **7**.

      A crank **8** is carried by the shaft **3**. A spring is connected between the crank **8** and the lower end of the post **2** to return the beater and the foot board to their original  
25   position for the next striking.

      The eccentricity-adjustable cam system **100** of this

invention will be described more specifically with reference to FIG.2, FIG.3 and FIG.4.

The eccentricity-adjustable cam system **100** of this invention comprises a cam core **101** mounted on and attached  
5 to the shaft **3**, a cam member **102** rotatably connected to the cam core **101**, a positioning member **103** rotatably connected to the cam member **102**, a first pin **104** rotatably connecting the cam member **102** with the cam core **101**, a second pin **105** rotatably connecting the positioning member **103** with the  
10 cam member **102**, and a set screw **106** fastening the positioning member **103** onto the cam core **101**.

The set screw **106** fastens the positioning member **103** onto the cam core **101** to adjustably position the positioning member **103** onto the cam core **101**, while the cam  
15 core **101** remains affixed to the rotating shaft **3**, thereby defining the eccentricity of the cam system **100**.

With reference to FIG.2A through FIG.4B the eccentricity-adjustable cam system **100** of this invention will now be described in detail.

20 As shown in FIG.2B, a preferred embodiment of this invention provides a slot **109** passing through the positioning member **103** and four grooves **108a, 108b, 108c**, and **108d** in the positioning member **103**.

The width of the slot **109** is wider than outer  
25 diameter of the set screw **106** and narrower than the diameter of the set screw head. The length of the slot



defines the range wherein the eccentricity of the cam system **100** may vary. The four grooves are located spaced and the mid-portions of the grooves are cut by the slot **109**. The cam core **101** includes a female thread **111** for engaging the set screw **106**, and a protrusion **107** for engaging one of the four grooves in the positioning member **103**.

The eccentricity of the eccentricity-adjustable cam system **100** depends on which groove of the positioning member **103** engages the protrusion **107** on the cam core **101**.

Two representatives wherein the eccentricity of the cam system is adjusted are shown in FIG.3A and FIG.3B. In FIG.3A the cam system is adjusted to have the longest torque arm R, and in FIG.3B the cam system is adjusted to have the shortest torque arm R.

In FIG.3A the fourth groove **108d** of the positioning member **103** matingly engages the protrusion **107** of the cam core **101**, and as a result, the torque arm is maximum. In FIG. 3B the first groove **108a** of the positioning member **103** matingly engages the protrusion **107** of the cam core **101**, and as a result, the torque arm is minimum.

The torque arm between maximum and minimum can be obtained by utilizing second or third groove. By adjusting the torque arm as described above, the impact force and the restoring force can be altered.

Although this preferred embodiment provides the drum pedal with four-grade-tuning system, this invention should

not limited to any particular number of grooves in the positioning member **103**. The positioning member **103** may have two, three or a plurality of grooves more than four.

Another embodiment of this invention will be  
5 described with reference to FIG.4A and 4B.

The cam core **101** is provided with no protrusion and the positioning member **103** is provided with no groove. As shown in FIG.4B, the positioning member has a slot **109** passing through the positioning member **103** and the cam core  
10 has a corresponding female thread **111** for the the set screw **106**. The width of the slot **109** is wider than outer diameter of the set screw **106** and narrower than the diameter of the set screw head. The length of the slot **109** defines the range wherein the eccentricity of the cam system may vary.  
15 The eccentricity of the cam system depends on which portion of the slot **109** the positioning member **103** is fastened onto the cam core **101** at.

This embodiment provides more various and exquisite adjustment for the eccentricity of the cam system.

20 The operation of the bass drum pedal of the present invention will be illustrated in detail hereinafter with reference to drawings.

As easily understood from FIG.1, when the drummer steps on the foot board **6**, the front end of the foot board  
25 is depressed and accordingly the flexible drive linkage **7** connected to the front end of the foot board is displaced

downward thereby rotating the eccentricity-adjustable cam system **100**.

The rotation of the cam system **100** causes the rotating shaft **3** to rotate thereby driving the beater **4** to  
5 strike the drum head **10**.

The rotation of the rotating shaft **3** also causes the crank **8** to rotate thereby elongating the spring **9**, and accordingly the restoring force is applied to the foot board **6** for returning the foot board to the original up-  
10 position.

When the drummer stops depressing the foot board **6**, the foot board returns to its original up-position by the spring **9** for the next striking.

With the same stepping force on the foot board **6**, the  
15 impact force acted on the drum head **10** by the beater **4** and the restoring force applied to the foot board **6** by the spring **9** depends on the torque arm.

The user may adjust easily the bass drum pedal of this invention wherein the eccentricity of the cam system  
20 is adjustable thereby varying the impact force and the restoring force to suit the user's playing style.

Therefore the user need not purchase a new drum pedal but may just tune up the pedal of this invention by adjusting the eccentricity of the cam system to suit his  
25 changed playing style.

And with a single cam system of this invention the

user can readily alter the performance characteristics,  
playing response and overall feels of the drum pedal to the  
user, so the user need not carry a plurality of cam members.

While the foregoing invention has been illustrated  
5 and described with reference to a number of preferred  
embodiments, it will be understood by those having skill in  
the art that various changes in form and detail may be made  
therein without departing from the spirit and scope of this  
invention.

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